

5-3 The student will demonstrate an understanding of features, processes, and changes in Earth's land and oceans. (Earth Science)

Key Concepts:

Constructive processes: deposition, volcanic eruptions, floods

Destructive processes: weathering (physical or chemical), erosion, landslides, earthquakes, floods

Ocean floor landforms: continental shelf, continental slope, mid-ocean ridge, rift zone, trench, ocean basin

Ocean shore zone features: beaches, shoreline, barrier islands, estuaries, inlets

Water movement: waves, crest, trough; currents, surface currents, warm surface currents, cold surface currents; tides, high tide, low tide

Supporting Content Web Sites

US Geological Survey

<http://earthquake.usgs.gov/learning/>

Links to information on earthquakes, resources for students and teachers

5-3.1

An Educator's Guide to Folly Beach, SC

<http://oceanica.cofc.edu/An%20Educator%27sl%20Guide%20to%20Folly%20Beach/guide/default.htm>

This site contains basic information on SC barrier islands including background content, images, and animation of coastal processes.

5-3.4

Barrier Islands of SC: Aerial Image Browser

<http://oceanica.cofc.edu/history/>

This aerial image browser is an online, interactive educational site, concentrated on presenting geologic and morphologic information about the 18 barrier islands of South Carolina.

5-3.4

Forces of Nature

<http://www.nationalgeographic.com/forcesofnature/>

This site contains simulations, maps, case studies, general information, fast facts and a glossary for earthquake and volcanoes.

5-3.1

Earth: Our World in Motion

<http://ology.amnh.org/earth/index.html>

This site is very student friendly containing links to an interactive dive to deep sea vents on the Alvin, an interactive look at basic plate tectonics, and a section called "Meet the Ologists" where students learn about careers in earth science.

5-3.1, 5-3.2

Volcanoes Live

<http://www.volcanolive.com/volcanocams.html>

Links to dozens of volcano and geyser cams, including Mount St. Helens, Old Faithful, Mauna Loa, Mt. Etna. Individual sites have various links to other information and resources.

5-3.1

Earthquake Center, Charleston Southern University

<http://www.csuniv.edu/version3/academics/earthquake/index.asp>

This site has downloadable SC earthquake brochures and data, maps of SC earthquake locations, and links for teachers to interactive sites such as SCEPP, IRIS, GSA, and USGS. Somewhat advanced for students; good teacher information

5-3.1

Suggested Literature

Theodorou, R. (2000). *Amazing Journeys to the Depths of the Ocean*. Chicago: Heinemann Library.

ISBN: 1-57572-484-7

Geographic features from the continental shelf to the depths of the abyss are explained with colorful photographs and interesting facts. Plants and animals that live in each zone of the ocean are featured. The author also discusses conservation issues such as pollution and over-fishing.

5-3.2, 5-3.6

Spilsbury, L. (2004). *Awesome Forces of Nature: Thundering Landslides*. Chicago: Heinemann Library.

ISBN 1403447861.

Readers will explore the various causes of landslides, including the effects of human actions. The book features clear and understandable text supported by photographs, maps, and diagrams.

5-3.1

Winner, S. (2000). *Erosion*. Carolrhoda/Lerner.

ISBN 1-57505-223-7

Photographs offer the reader views of one of nature's strongest land-shaping forces. The text provides information on glaciers, water, and wind as forces of erosion, as well as how these forces shape the Earth's surface.

5-3.1

Walker, S. (1996). *Earthquakes*. Carolrhoda.

ISBN: 0-87614-888-7

This book defines key terms in earthquake science while colorful diagrams illustrate basic concepts. Readers learn how scientists can predict an earthquake and measure its intensity.

5-3.1

Wermund, J. (2003). *Earthscapes: Landforms Sculpted by Water, Wind, and Ice*. Texas: Rockon Publishing.

ISBN: 097262550X

Poetic descriptions of landforms such as glaciers, canyons, and alluvial fans as well as the forces and events that shape them, including volcanic eruptions, erosion, and gravity. 5-3.1

O'Neill Grace, C. (2004). *Forces of Nature: The Awesome Power of Volcanoes, Earthquakes, and Tornadoes*. National Geographic Society.

ISBN 0-7922-6328-6

Lexile:1080L

This book explains, in scientific terms, using color photographs from recent events, how these events occur and the effects these catastrophes can have on human populations.

5-3.1

Harrison, D.L. (2003). *Oceans: The Vast, Mysterious Deep*. Pennsylvania: Boyds Mills Press.

ISBN 1590780183

Geographic aspects of the ocean are explained, including mountains, volcanoes, and earthquakes as well as the Earth's formation and plate tectonics. Human uses are included, focusing on conservation and pollution issues.

5-3.2, 5-3.6

Lindop, L. (2003). *Probing Volcanoes*. Twenty-First Century Books/Millbrook.

ISBN 0-7613-2700-2

This book provides a captivating account of scientists who venture into volcanic craters to learn the secrets of volcanoes, highlighting the rewarding and exciting careers of geologists and geochemists.

5-3.1

Varilla, M. (2004) *Scholastic Atlas of Oceans*. New York: Scholastic Inc.

ISBN 0439561280

Advanced topics like continental drift, land formation, currents, tides, tsunamis, and underwater landscapes are included using simple but accurate diagrams, photos, and attention-grabbing drawings.

5-3.1, 5-3.2, 5-3.5

Kampion, D. (2005). *Waves: From Surfing to Tsunami*. Utah: Gibbs Smith.

ISBN 1-58685-212-4

Combining technical writing and storytelling, photographs, and artwork, this book makes wave formation and movement interesting and easy to understand.

5-3.5

Suggested Streamline Video

Basics of Geology: Erosion and Weathering. United Learning. (1998).

Examples such as Yosemite Valley, Bryce Canyon, and the Grand Canyon help students realize the long-term effects of erosion and weathering.

4:45

5-3.1

Basics of Geology: Formations of Continents and Mountains. United Learning. (1998).

This video presents the basic terms of geology, the diversity of the earth's surface, and the planet's internal structure. Concepts such as folding and buckling, subduction, volcanism, undersea mountains, and earthquakes are all explored.

4:01 Volcanoes and mountain building (includes Mt. Shasta)

2:45 Earthquakes

5-3.1, 5-3.2

Closer Look at Earth, A: Space Science Series. 100% Educational Videos. (2004).

Segment 5: *The Earth Changes Slowly*. Discusses weathering by wind, water, and glaciers

2:32

Segment 6: *The Earth Changes Quickly*. Discusses earthquakes and volcanoes

3:38

5-3.1

Enviro-Tacklebox: Module 4: Forces in the Environment: Erosion on the Move. Louisiana Public Broadcasting. (2002).

Niagara Falls, the South Dakota Badlands, and farm fields in Illinois and Kansas are all locations visited by the Enviro-Tacklebox Team as they investigate the formation and relocation of our soils. While reviewing the work of running water, waves, wind, and ice, viewers will explore the importance of soil.

19:42

5-3.1

Enviro-Tacklebox: Module 4: Forces in the Environment: The Earth: Work in Progress.

Louisiana Public Broadcasting. (2002).

The forces released during earthquakes, volcanic eruptions, and sinkhole formations result in dramatic change to the Earth's surface. The Tacklebox Team introduces students to scientists researching these processes and forces of change in our environment.

13:20

5-3.1

Geologist's Notebook: Why Land Goes Up and Down. United Learning. (2003).

This show looks at two processes that carve our landscape - uplifting and erosion. It explains how heat from the center of Earth powers the building of mountains and plateaus by moving

plates. It examines how the forces of erosion - especially moving water and gravity - work to reduce uplifted crust to sediments and flat land. The effect of glaciers is also included.

11:00

5-3.1

Magic School Bus Blows Its Top, *The*. Scholastic. (1995).

Ms. Frizzle presents the kids with the missing piece to their gigantic Earth puzzle--an island that hasn't been discovered yet. When they reach the spot where it's supposed to be, all they see is the sea. It takes a run-in with an explosive underwater volcano to help them understand how the earth makes new landforms.

23:56

5-3.1, 5-3.2

Weathering and Erosion. 100% Educational Videos. (2002).

Water, rain, snow, and wind—they all continually shape and form the Earth. Students learn how physical weathering, chemical weathering, and erosion occur. Learn that the destructive forces of erosion and weathering are slow processes that change the surface of the earth.

20:00

5-3.1

Earth: A First Look. Rainbow Educational Media (2000).

Part 3: How the Land Changes Shape

Students will see that Earth's crust changes because of volcanoes, weathering and erosion.

6:22

5-3.1

Oceans: Earth's Last Frontier. Rainbow Educational Media. (1995).

Students will discover that oceans are vital to the health of our planet and cover 70% of the earth's surface. Oceans have mountain ranges thousands of miles long and trenches far deeper than the Grand Canyon.

Part 4: Descending into the Depths: Exploring the Ocean Floor

8:07

Part5: Ocean Movements: tides, currents, waves

5:33

5-3.2, 5-3.4, 5-3.5

Junior Oceanographer: Where the Water Meets the Land. United Learning (1995).

Illustrates and explains how forces, such as water and waves, act upon oceans and the land.

15:32

5-3.2, 5-3.3, 5-3.4

Eye Wonder: Oceanography. SCETC/ITV (2002).

The ocean is explored by an oceanographer. The concepts of salt, currents, and waves are explained.

7:33

5-3.5

Source of Life: Water in Our Environment. Rainbow Educational Media (1992)

Living things need water to survive. The video show major causes of ocean pollution along with ways that problems can be addressed.

Part 2: How Actions of Humans Threaten Our Oceans

7:10

Part 4-2: How Can You Help: Water Conservation

4:36

5-3.6

Career Connections

Geologist: Geologists study the physical aspects and history of the earth. They identify and examine rocks, study information collected by remote sensing instruments in satellites, conduct geological surveys, construct maps, and use instruments to measure the earth's gravity and magnetic field. Some geologists search for oil, natural gas, minerals, and underground water. They play an increasingly important part in studying, preserving, and cleaning up the environment. Many design and monitor waste disposal sites, preserve water supplies, and reclaim contaminated land and water to comply with stricter Federal environmental rules. They also help locate safe sites for hazardous waste facilities and landfills.

Seismologist: Seismologists study the location and force of earthquakes to understand their origin, minimize their effects, and to predict future occurrences.

Physical Oceanographers study the physical conditions and physical processes within the ocean such as waves, currents, eddies, and tides; the transport of sand on and off beaches; coastal erosion; and, the interactions of the atmosphere and the ocean. They examine deep currents, the ocean-atmosphere relationship that influences weather and climate, the transmission of light and sound through water, and the ocean's interactions with its boundaries at the seafloor and the coast. Physical Oceanographers who are acousticians are using sound to examine the ocean's natural sound channels and provide information about global warming.

Geological Oceanographers and Marine Geologists: These scientists explore the ocean floor and the processes that form its mountains, canyons, and valleys. Through sampling, they look at millions of years of history of seafloor spreading, plate tectonics, and oceanic circulation and climates. They also examine undersea volcanic processes, mantle circulation, hydrothermal circulation, magma creation, and crustal formation. The results of their work help us understand the processes that created the ocean basins and the interactions between the ocean and the seafloor. An exciting new possibility is that studies of the exotic life forms living around hydrothermal vents could help shape the search for life in our solar system.

Volcanologist: A Volcanologist is a person who studies volcanoes using empirical observation to make coherent predictions, explanations and general principles. The observation of volcanic eruptions and volcanic phenomenon are then used in volcanology research. A single observation made by an observer in the field can have enormous scientific implications and advance the scientific field of volcanology.